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3,336,704

SHEET WEB ROOF STRUCTURE WITH UNDERLYING AND
OVERLYING CONSTRAINING WIRES

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2 Sheets-Sheet 1

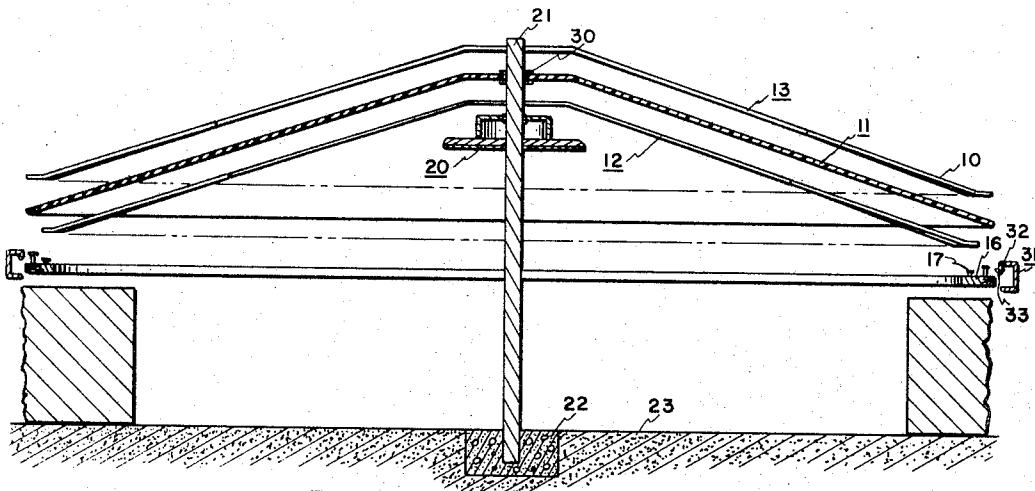


FIG. 1

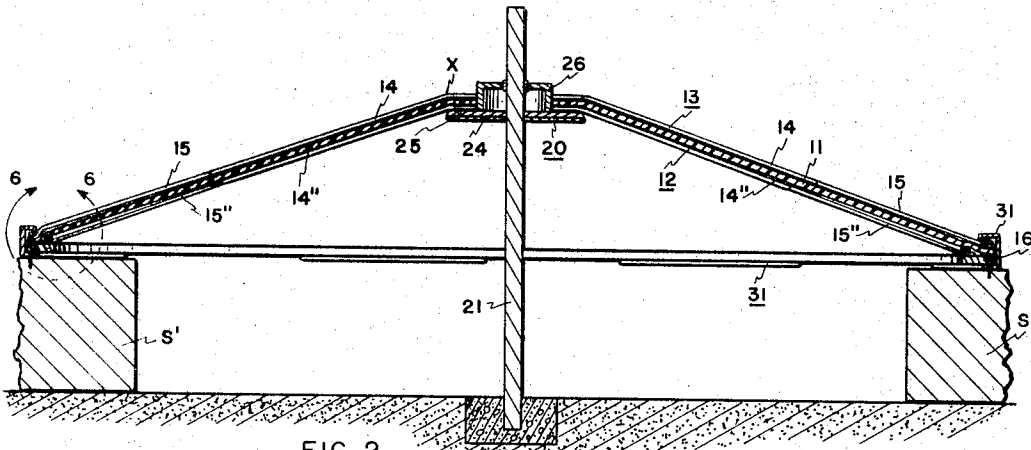


FIG. 2

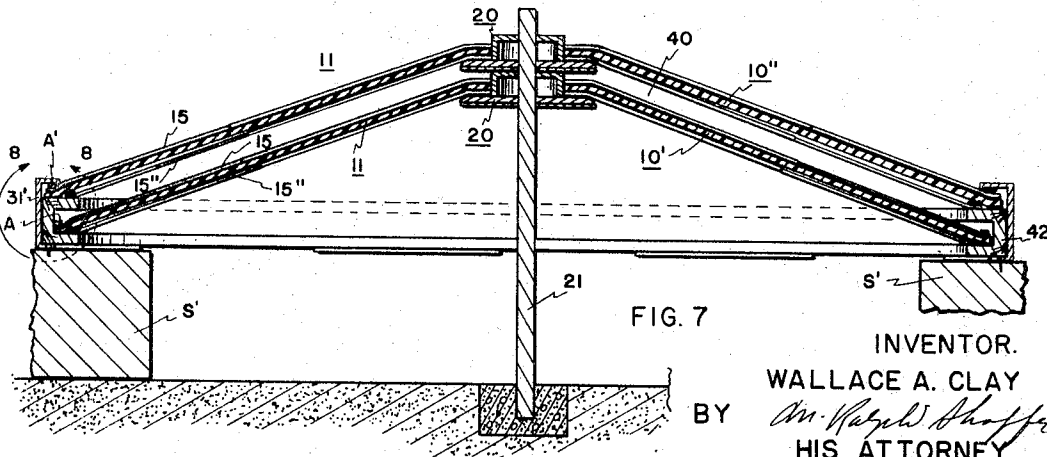


FIG. 7

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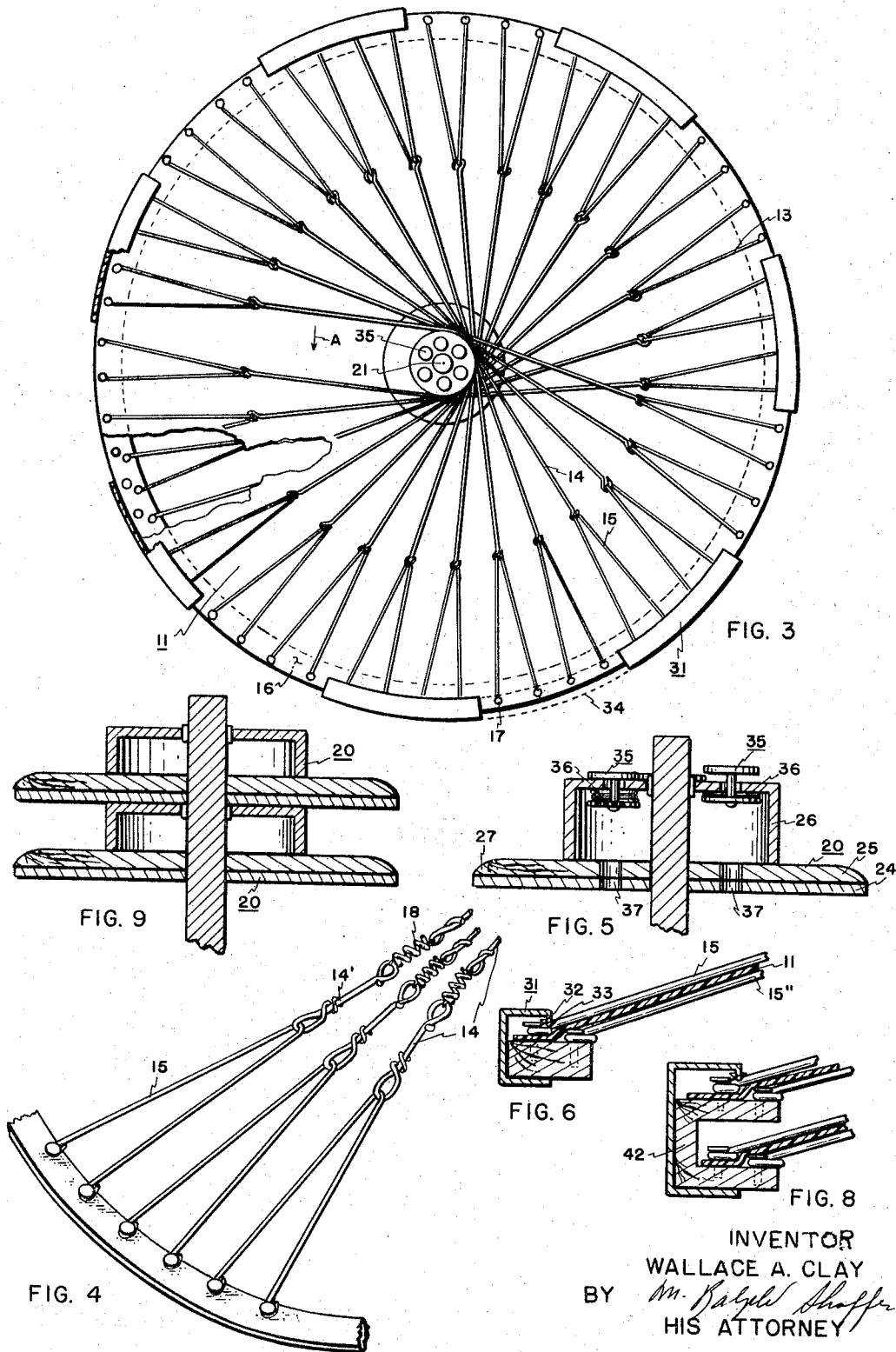
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1 Claim. (Cl. 52-23)

ABSTRACT OF THE DISCLOSURE

The present invention consists essentially in the provision of a roof, and ancillary structure wherein the roof proper is formed of at least one sandwich construction comprising flexible sheet material disposed between underlying and overlying, constraining mazes. In a preferred form of the invention a pair of such sandwich constructions are mutually spaced apart to define a medial air-chamber. Novel peripheral means are provided to complete the structure as to mounting and sealing.

The present invention relates to roof constructions and ancillary equipment and, more particularly, to a new and improved roof for commercial buildings, homes, atriums, swimming pools, resorts, and so forth, which are inexpensive to construct and erect, durable, and translucent if desired.

The last decade in particular has seen the advance of numerous different types of roofing material and structure. All include at least some framing including ceiling joists, rafters, and trussed or pre-stressed structures. All of this construction is inconvenient and undesirable in many instances where lightweight and possible translucent materials are to be desired. If a roof could be devised so as to be free from all the bracing and trussing normally required, then the same would lend itself ideally to translucent sections or may even be completely translucent throughout. Particularly is this desired in resort areas in the wintertime, over a swimming pool, and the like.

Accordingly, a principal object of the present invention is to provide a new and improved, light-weight, easily-assembled roof construction for specialty and other uses.

A further object is to provide a new sandwich-type roof construction which is adapted to air-conditioning and light passage therethrough.

An additional object is to provide a sandwich-roof construction wherein plastic sheeting may be used, and yet suitably constrained by a simple wire means, so that the roof will be durable and retain its desired configuration.

An additional object is to provide a multiple-sandwich-type roof wherein an air or reduced pressure area is preserved between adjacent sandwiches of the roof structure.

An additional object is to provide a roof structure including mazes of multiple wires so constructed and arranged together to provide suitable and yet light-weight support structure for an interior web sheeting.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings in which:

FIGURE 1 is a partially exploded, vertical section of a roof structure incorporating the principles of the present invention.

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FIGURE 2 is a section similar to FIGURE 1 but illustrates the structure in installed condition.

FIGURE 3 is a top plan of the structure shown in FIGURE 2.

FIGURE 4 is an enlarged fragmentary section of a portion of one of the wire mazes of the present invention, wherein tensioning springs are used to retain the tensioned construction of the individual mazes.

FIGURE 5 is an enlarged fragmentary section of the upper portion of the roof structure wherein valve means are used for pressure relief purposes.

FIGURE 6 is an enlarged section detail taken along the lines 6-6 in FIGURE 2.

FIGURE 7 is a vertical section of another form of the invention wherein a double-sandwich construction is used with the roof structure.

FIGURE 8 is an enlarged detail taken along the line 8-8 in FIGURE 7.

FIGURE 9 is a fragmentary vertical section similar to that shown in FIGURE 5, but with a pair of horizontal, disc-configured means being provided for the structure when taking the form illustrated in FIGURE 8.

In FIGURES 1-3 the roof 10 of the present invention is shown to consist of a sandwich construction including a central web 11, a support maze 12, a retainer maze 13, and other structure hereinafter to be described. Web 11 is translucent and composed of polyethylene or polyurethane sheet plastic, for example, and is preferably itself reinforced with an integral nylon or other type webbing. The support and retainer mazes 12 and 13 preferably combined to comprise individual multiplicities of wires which are arranged, for example, in the manner as illustrated in FIGURE 3. There, the retainer maze 13 includes a plurality of central wires 14 which are retained outwardly at their extremities by looped retainer wires 15. The extremities of wires 15 are secured in place by nails, screws, or other attachment means to an annular rim 16. The attachment 17 used are indicated in FIGURES 1 and 3.

An enlarged view of a typical maze structure is illustrated in FIGURE 4 wherein it will be seen that the central wires, termed 14' in FIGURE 4, may include self-adjusting springs 18 medially secured there-within, this so as to tension or take up slack that may exist by virtue of expansion of the wires, loosening of the attachments, and so forth. Thus, it is seen that a taut support maze 12 (and retainer maze 13 as well) may be provided. Furthermore, it will be understood that additional wires may be included in the direction of the arrow so as to make inter-wire distance at a chosen minimum. The wired configuration in FIGURE 3 is deemed highly desirable in that the extremity wires 15 reduce inter-wire distance along the outer chord lengths of the wire segments.

Again, both of the mazes 12 and 13 may be constructed in the manner as indicated in FIGURE 3 and be disposed against the medial web 11 on either side thereof.

In practice there will be supplied a central support means 20 which is affixed to central support pole 21 mounted in cementitious block 22 proximate ground plane 23. The central support means 20 is shown in FIGURES 1 and 2 to include a mounting plate 24, a "brim" affixed to and disposed thereover as indicated at 25, and a crown 26. Thus, the central support means may take the form of a hat-configured support member. As shown in FIGURE 5, the brim 25 of the structure is preferably rounded at its outer margin 27 so as to provide an easy arcuate contour to accommodate the gradual bending of the several wires 14 at X, for example, to provide the roof an inverted-dish configuration. It will be understood that the wires 14 and 14', as well as wires 15 and 15', will correspond in general orientation as indicated in FIGURE 3.

As to installation, in practice the central support pole will be set in concrete as illustrated in FIGURES 1 and 2 and the structural support member or means 20 welded or otherwise secured in place as indicated. Then, the rim 16 is positioned coaxially about support pole 21 and the lower or support maze 12 of wires installed. To perform this latter function the wires 14 and 15 (and 14' and 15' as well) will be initially secured together, one extremity of each of the respective sets of wires 15 and 15' will be secured to the rim 16, and the remaining extremities will be tightened and secured to rim 16 so as to have an over-all supporting wire construction or maze 12. Subsequently, the plastic web or sealing material 11 will be installed over the pole and after this the remaining maze wires, i.e. retainer maze 13, will be positioned and installed in much the same manner as that previously indicated in connection with support maze 12. If desired, the central plastic web 11 may include a grommet-configured portion or element 30 for wear purposes.

Additional securement may be provided in a peripheral, channel-configured clamping ring or channel 31 having depending flange 32 mounted into rubber ring 33. In this way the channel may be clamped in a multi-piece construction, for example, so that the rubber ring comes in sealing contact with the plastic of the roof and yet permits slight relief indentations for the wires passing thereover. This will provide a good sealing construction. The rims 31 may comprise either separate segments as indicated in FIGURE 3 or segments joined together as indicated by dotted line 34. Preferably there may be included valves 35 which are spring-loaded by spring means 36 in the central support means 20 as indicated. Furthermore, the latter may include air access apertures 37 as shown. The reason for these valves will now become clear. In climates which are either excessively cold or excessively hot, it may well be desirable to pump air beneath the roof construction, this is for the comfort and convenience for occupants. Valves 35 supply a simple relief valve means wherein excessive air pressures occurring underneath the canopy or roof may be relieved and desired pressures retained in the interior of the structure covered by the sandwich roof construction of the present invention. However, the valves are optional and need not be included if so desired. See FIGURES 1 and 2.

FIGURES 7, 8, and 9 indicate an optional type of construction wherein a double, sandwich-type construction is used, with a simple air space or reduced pressure area 40 being included therebetween. The structure heretofore described is simply duplicated, with two of the support units 20 preferably contacting each other as illustrated in FIGURE 7, see also FIGURE 9 in this regard. The central support units or members are welded or keyed or otherwise affixed to the central support pole 21. In practice the uppermost support means 20 will be installed lastly after the lowermost roof sandwich at 10' in FIGURE 7 is installed. Thereafter the second roof construction 10'' will be installed in a manner similar to that heretofore described with the previous figures. In such a

construction a mounting ring 42 can be used accommodating the fixed retention of wire extremities 15 and 15' of each of the roof sandwiches. Screws, nails, pins or other attachments as at A and A' will secure the wire extremities in the manner indicated. A subsequent rim or channel-like ring 31' may be installed to lap over the edges of the wires and web sheeting 11 used.

In practice the margin rings or channels 31 and 31' will be anchored to their respective supports S and S' and be supported thereby and, preferably as well, by the central pole 21. The sandwich construction of the roof in any event offers a convenient radial run-off for rain or snow. It further serves as a taut and satisfactory roof beneath which air conditioning may be introduced. The construction is proven to be remarkably less expensive than conventional trussed roof constructions; yet, the construction is very sturdy, this owing to the multiplicity of wires. Furthermore, there is no restriction as to size of the device or the area which may be covered thereby.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects, and, therefore, the aim in the appended claim is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

A roof construction including, in combination, a support wire maze; a sheet web disposed over said support wire maze for support thereby; a retainer wire maze disposed over said sheet web for retaining the same against said support wire maze; a hat-configured central support means having brim means and crown means, said mazes comprising wires routed over said brim means and at least part-way around said crown means; a peripheral rim member secured to the peripheral extremities of said wire mazes; and a peripheral ring encompassing said rim member, the peripheral margin of said sheet web, and said peripheral extremities of said wire mazes, said peripheral ring being inwardly channel-configured and including a lip-flange means provided with a resilient sealing edge, sealingly contacting said retainer wire maze and said peripheral margin of said sheet web.

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